UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/681,360	03/26/2001	Quang Nguyen	IComm-16	5296

26538 7590 02/22/2005

ICOMM TECHNOLOGIES INC
7 GREAT VALLEY PARKWAY
SUITE #210
MALVERN, PA 19355

EXAMINER	
FAN, CHIEH M	

ART UNIT	PAPER NUMBER
2634	

DATE MAILED: 02/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/681,360	NGUYEN, QUANG	
	Examiner	Art Unit	
	Chieh M Fan	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 November 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11-48* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11-48* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 March 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This Office Action is in response to the Request for Continued Examination (RCE) and the amendment filed on 11/24/04.

Claim Objections

1. Claims 11-32 are objected to because of the following informalities:

Regarding claim 11, claim 11 is listed as "previously presented", but is not the same as its previous version. In particular, the limitation "a serial-to parallel converter that converts a received first bit-stream into a plurality of first cub bit-stream" is missing. Such limitation should be added to the claim. Further, "Fast F ourier Transform" in lines 11-12 should be changed to --- Fast Fourier Transform ---.

Regarding claim 13, the amendment of claim 13 fails to meet the requirement of 27 CFR 1.121. The deleted text must be shown by strikethrough. Further, "f" in lines 6 should be changed to --- for ---.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 11, 14-22, 25-27, 33-35, 37 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Walton et al. (U.S. Patent No. 6,493,331, "Walton" hereinafter) in view of Van Nee (U.S. Patent No. 6,175,550).

Regarding claims 11, 33, 34, and 35, Walton teaches a modulation and demodulation system, comprises a transmitter (1416A-1416T in Fig. 15) and a receiver (1422A-1422R in Fig. 14);

Wherein the transmitter comprising:

a serial-to-parallel converter (1510 in Fig. 15) that converts a received first bit-stream into a plurality of first sub bit-streams;

a plurality of Turbo Code encoders (1512A-1512K in Fig. 15, col. 52, lines 32-46) that correspond in number to the plurality of first sub bit-streams, wherein each Turbo Code encoder is coupled to a corresponding output of the serial-to-parallel converter;

a plurality of mappers (1532A-1532K, 1430 in Fig. 15; col. 53, lines 26-29; col. 54, lines 56-59; col. 46, line 46) that correspond in number to the plurality of Turbo Code encoders, wherein each mapper is coupled to an output of a corresponding Turbo Code encoder;

a channel selector (1534 in Fig. 15; col. 54, lines 34-36) that is coupled to each of the mappers for receiving an output from each of the corresponding mappers;

an inverse Fast Fourier Transform (IFFT) processor (1520A-1520T in Fig. 15) that is coupled to the channel selector for receiving the plurality of first sub-bit streams processed by the plurality of Turbo Code encoders, wherein the channel selector

assigns the plurality of first sub-bit streams to a plurality of first sub-channels associated with the complex inverse Fast Fourier Transform processor, wherein the inverse Fast Fourier Transform processor outputs a plurality of first complex samples.

Note that it is well known that a receiver performs reverse procedures of a transmitter. Walton therefore implicitly teaches the limitations "a Fast Fourier Transform processor", "a channel deselector", "a plurality of demappers", "a plurality of Turbo Code decoders" and "a parallel-to-serial converter" that converts a received plurality of second sub bitstreams into a second bit-stream.

Walton does not specifically teach that the IFFT and the FFT processors are complex processors.

However, it is understood in the art that a complex IFFT processor is explicitly required when the data to be transmitted are complex (i.e., having I and Q components), and similarly, a complex FFT processor to convert the received signal to complex symbols. For example, Van Nee teaches an OFDM system that comprises a complex IFFT processor, which converts M-PSK or M-QAM symbols to time-domain signals (col. 4, lines 40-45). Since the data of Walton are either M-PSK symbols or M-QAM symbols, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to recognize that the IFFT (or FFT) processor is a complex processor so as to convert complex symbols to (or from) time-domain signals.

Regarding claims 14 and 16-18, Walton further teaches that his system may be advantageously employed in numerous applications. For example, the invention can be used in a communications system that provides broadband packet data services, which

can be used to support the Internet, E-commerce, distribution of content, broadcast of media, and many other applications. The invention can be used to provide voice, video, data, text, and so on, over a wireless communications system to users in home, work, and mobile environments. (See col. 36, lines 48-56)

Regarding claim 15, as shown in Fig. 15 of Walton, the turbo encoder 1512 process the data at baseband (before the data are up-converted to RF, see 1524).

Regarding claims 19, 20, 26 and 27, Walton teaches that IFFT/FFT processor are adapted to implement an orthogonal frequency division technique (col. 53, lines 63-65), that is, the carrier frequencies are orthogonal to each other.

Regarding claims 21, 22, 37 and 38, the selection of the code rate and the constraint length of a turbo code encoder is merely a matter of design choice, dictated by the user's requirement such as error performance and cost. Specifying the values of the code rate and the constraint length of a turbo code encoder/decoder would not present any novelty. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to select any values for the code rate and constraint length, such as the claimed values, in the turbo code encoder/decoder of Walton to meet the user's requirement.

Regarding claim 25, Walton teaches using a demultiplexer (1510 in Fig. 15, col. 52, lines 27-34) to divide high-speed bit-stream into multiple slow-speed sub bit-streams.

4. Claims 12, 13, 31, 32, 36, 39 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Walton et al. (U.S. Patent No. 6,493,331, "Walton" hereinafter)

in view of Van Nee (U.S. Patent No. 6,175,550) as applied to claim 11 above, and further in view of Pierzga et al. (US 2001/0055320, "Pierzga" hereinafter), and Seki et al. (U.S. Patent No. 5,771,224, provided by the applicant in the IDS filed 11/28/02, "Seki" hereinafter).

Regarding claims 12, 13, 36, Walton in view of Van Nee teaches the claimed invention, including a guard interval adder coupled to the IFFT processor at the transmitter and a guard interval remover at the receiver (1522A-1522T in Fig. 15 of Walton), but does not teaches (a) the up-converter comprises a wave shaper, (b) the up-converter comprises an IQ modulator, (c) the down-converter comprises an IQ demodulator, (d) an AFC clock recovery circuitry.

With respect to item (a), Pierzga teaches a pulse shaping filter is used in an OFDM system such that more efficient use can be made of the available RF spectrum (see paragraph 0156). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate wave shaper into the up-converter of Walton, such that more efficient use can be made of the available RF spectrum.

With respect to item (b) and (c), it is well known an IQ modulator and IQ demodulator are explicitly required in a communication system that communicate data with I and Q components using radio frequency, because the data need to be converted to/from the radio frequency. Seki teaches an IQ modulator at an OFDM transmitter (16 in Fig. 3) and an IQ demodulator at an OFDM receiver (23 in Fig. 4). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was

made to recognize that there must be an IQ modulator in the up-converter of Walton and an IQ demodulator in the down-converter of Walton because the IQ modulator and demodulator are explicitly required.

With respect to (d), Seki teaches an AFC circuitry (25 in Fig. 4) in an OFDM receiver. It is well known that, in order to successfully demodulate the received signal in a communication system, the receiver must be synchronized with the transmitter. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate an AFC circuitry in the receiving end of Walton, so as to successfully demodulate the received signal.

Regarding claims 31, 32, 39 and 40, an IQ modulator (or demodulator) inherently modulates (or demodulates) the data using a sine wave for one of the I and Q components and using a cosine wave for the other of the I and Q components.

5. Claims 23, 24, 42, 44 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Walton et al. (U.S. Patent No. 6,493,331, "Walton" hereinafter) in view of Van Nee (U.S. Patent No. 6,175,550) as applied to claim 11 above, and further in view of Berens et al. (U.S. Patent No. 6,272,183, "Berens" hereinafter).

Regarding claims 23 and 24, Walton in view of Van Nee teaches the claimed invention, including using 8-PSK modulation (see col. 53, line 28, col. 46, line 46 of Walton, or see col. 4, line 42 of Van Nee), but does not teaches the turbo codes baseband processor uses a SISO MAP decoder to decode the received data.

Berens teaches decoding the turbo codes based on the use of SISO MAP decoder (col. 1, lines 27-32). Therefore, it would have been obvious to a person of

ordinary skill in the art at the time the invention was made to use a SISO MAP decoder in the turbo codes baseband processor of Walton to decode the received data, so as to obtain optimum results.

Regarding claims 42 and 45, Walton in view of Van Nee teaches the claimed invention, including using 8-PSK modulation (see col. 53, line 28, col. 46, line 46 of Walton, or see col. 4, line 42 of Van Nee), but does not teaches the turbo codes baseband processor uses a SISO iterative MAP decoder to decode the received data.

Berens teaches decoding the turbo codes based on the use of SISO iterative MAP decoder (col. 1, lines 27-32, and col. 6, lines 53-59). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a SISO iterative MAP decoder in the turbo codes baseband processor of Walton to decode the received data, so as to obtain optimum results.

Regarding claim 44, the selection of the code rate and the constraint length of a turbo code encoder is merely a matter of design choice, dictated by the user's requirement such as error performance and cost. Specifying the values of the code rate and the constraint length of a turbo code encoder/decoder would not present any novelty. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to select any values for the code rate and constraint length, such as the claimed values, in the turbo code encoder/decoder of Walton to meet the user's requirement.

6. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Walton et al. (U.S. Patent No. 6,493,331, "Walton" hereinafter) in view of Van Nee (U.S. Patent

No. 6,175,550) as applied to claim 11 above, and further in view of Cupo et al. (U.S. Patent No. 6,377,566, "Cupo" hereinafter).

Walton in view of Van Nee teaches the claimed invention, but does not teach channel hopping.

However, channel hopping has been long used in radio communication for the purpose reducing disturbances. Cupo teaches an OFDM subcarrier hopping method (see title, abstract, 150 in Fig. 1A), which has the advantage of reliably carrying information even in a selective channel fading environment (col. 1, lines 6-10).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the feature of channel hopping into the channel selector, so as to reduce disturbances and thereby to reliably transmit data.

7. Claims 29, 30 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Walton et al. (U.S. Patent No. 6,493,331, "Walton" hereinafter) in view of Van Nee (U.S. Patent No. 6,175,550) as applied to claim 11 above, and further in view of Hornsby et al. (U.S. Patent No. 6,396,803, "Hornsby" hereinafter).

Walton in view of Van Nee teaches the claimed invention, but does not teaches that the first bit stream is received from a Media Access Layer and the second bit stream is transmitted from a Media Access Layer.

However, it is well known in the art that, for network communication, the data have to pass through Medium Access Control Layer in order to send/receive the information to/from the user. Hornsby teaches an OFDM signal is coupled to a medium

access controller (41, 42 in Fig. 2, or 64, 66 in Fig. 3). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to recognize that a medium access controller is required in the system of Walton/Van Nee to receive the first bit stream and to transmit the second bit stream, so as to receive/send information to the user.

8. Claims 43, 46 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Walton et al. (U.S. Patent No. 6,493,331, "Walton" hereinafter) in view of Van Nee (U.S. Patent No. 6,175,550) and Berens et al. (U.S. Patent No. 6,272,183, "Berens" hereinafter) as applied to claim 42 above, and further in view of Seki et al. (U.S. Patent No. 5,771,224, provided by the applicant in the IDS filed 11/28/02, "Seki" hereinafter).

Regarding claim 43, Walton in view of Van Nee and Berens teaches the claimed invention, including a guard interval adder coupled to the IFFT processor at the transmitter and a guard interval remover at the receiver (1522A-1522T in Fig. 15 of Walton), but does not teaches that the transmitter comprises an IQ modulator and the receiver comprises an IQ demodulator.

However, it is well known an IQ modulator and IQ demodulator are explicitly required in a communication system that communicate data with I and Q components using radio frequency, because the data need to be converted to/from the radio frequency. Seki teaches an IQ modulator at an OFDM transmitter (16 in Fig. 3) and an IQ demodulator at an OFDM receiver (23 in Fig. 4). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to

recognize that there must be an IQ modulator in the up-converter of Walton and an IQ demodulator in the down-converter of Walton because the IQ modulator and demodulator are explicitly required.

Regarding claims 46 and 47, an IQ modulator (or demodulator) inherently modulates (or demodulates) the data using a sine wave for one of the I and Q components and using a cosine wave for the other of the I and Q components.

9. Claim 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over Walton et al. (U.S. Patent No. 6,493,331, "Walton" hereinafter) in view of Van Nee (U.S. Patent No. 6,175,550) and Berens et al. (U.S. Patent No. 6,272,183, "Berens" hereinafter) as applied to claim 42 above, and further in view of Hornsby et al. (U.S. Patent No. 6,396,803, "Hornsby" hereinafter).

Walton in view of Van Nee and Berens teaches the claimed invention, but does not teaches that the first bit stream is received from a Media Access Layer and the second bit stream is transmitted from a Media Access Layer.

However, it is well known in the art that, for network communication, the data have to pass through Medium Access Control Layer in order to send/receive the information to/from the user. Hornsby teaches an OFDM signal is coupled to a medium access controller (41, 42 in Fig. 2, or 64, 66 in Fig. 3). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to recognize that a medium access controller is required in the system of Walton/Van Nee

to receive the first bit stream and to transmit the second bit stream, so as to receive/send information to the user.

Response to Arguments

10. Applicant's arguments filed 11/24/04 have been fully considered but they are not persuasive.

The applicant argues that Walton et al, fails to teach a complex inverse Fast Fourier Transform processor that is coupled to the channel selector for receiving the plurality of first sub-bit streams processed by the plurality of Turbo Code encoders, wherein the channel selector assigns the plurality of first sub-bit streams to a plurality of first sub-channels associated with the complex inverse Fast Fourier Transform. Rather, Walton et al. discloses a plurality of Inverse FFT processors 1520. Each of these IFFT processors receives only a sub-part of the data streams demultiplexed by demux 1410 (see page 16 of the reply).

Examiner's response --- As shown in Fig. 15 of Walton, each of the IFFT processors 1520A-1520T is associated with a respective antenna 1416A-1416T. Walton et al. further teaches that each transmitter unit may include a single transmit antenna or a number of transmit antennas (col. 52, lines 7-9). As the number of transmit antenna increases, antenna diversity increases and performance improves (col. 52, lines 18-20). Therefore, the use of more than one transmit antenna merely intends to increase transmit diversity and thereby to improve performance. If transmit

diversity is not used, only one transmit antenna is required (col. 52, line 64). Therefore, it is clear the configuration in Fig. 15 of Walton et al. may use only one antenna (i.e., transmit diversity is not used). When only one antenna is used (e.g. 1416A), there is only a single IFFT processor (e.g., 1520A) that receives all of the data streams.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chieh M Fan whose telephone number is (571) 272-3042. The examiner can normally be reached on Monday-Friday 8:00AM-5:30PM, Alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on (571) 272-3056. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chieh M Fan
Primary Examiner
Art Unit 2634

February 14, 2005